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INTERMOUNTAIN FOREST AND RANGE EXPERIMENT STATION
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BLACK HILLS BEETLE CONDITION
DIXIE NATIONAL FOREST
and
BRYCE CANYON NATIONAL PARK
UTAH

Appraisal Survey
September-October 1957

By
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INTRODUCTION

For the seventh consecutive year control measures have been applied to the epidemic of Black Hills beetle, Dendroctonus ponderosae (Hopk.), on the Dixie National Forest and Bryce Canyon National Park in southern Utah. Even though chemical treatment and salvage logging have effected a reduction of infested trees, a seven-year drouth has probably contributed to this continued high beetle activity. Under such conditions the beetle can and does readily build to epidemic proportions. Thus, as outbreaks have been brought under control, new ones in new areas appear requiring control efforts. Consequently there is a need to survey all ponderosa pine stands in order to recognize, describe and evaluate the new centers of activity.

SURVEY METHODS

An appraisal survey of the Black Hills beetle situation was conducted to determine the extent and numbers of newly infested trees on the Dixie National Forest and Bryce Canyon National Park. A systematic line-plot 5 percent cruise was conducted on all but a few areas. These small, irregularly shaped areas were scouted and the estimates derived by a trained man.

Data collected during the survey included the number and DBH of all infested trees within a plot and the number of points of attacks on a 1/2 sq. ft. sample from each infested tree.

SURVEY DATA BY UNITS

East Fork Division

The East Fork of the Sevier Division coincides with the Powell Ranger District. The area lies east of Panguitch, Utah, and U. S. Highway 89, adjacent to Bryce Canyon National Park.

Approximately 1813 trees were treated on the East Fork in 1957 and about 800 trees on the adjoining Bryce Canyon National Park.

There are approximately 1060±147 currently infested trees on this division, 490 of which are within the 1957 control area. Approximately 75,544 acres were surveyed within this division.

1. Badger-Ahlstrom--16,152 acres; 220±70 infested trees.

The Badger-Ahlstrom unit lies west of the East Fork of the Sevier River and includes the ponderosa pine type from the edge of type on the north to Badger Creek on the south. Approximately 1,020 trees were treated in this unit this year; 446 trees by chemical control and 574 were salvaged logging.

2. Daves Hollow - East Creek--8,466 acres; 40±26 infested trees.

This unit lies between the East Fork of the Sevier River and the Forest-Park boundary; north to edge of type and south to the drift fence along the south ridge of East Creek. The area is largely cutover and has sustained a relatively light incidence of beetle trees. However, in the past, control measures have been taken because of increase in brood. During 1957 approximately 400 trees were treated.

3. East Creek - Crawford--13,320 acres; 80±40 infested trees.

This unit is bounded by the East Creek drift fence on the north to Sieler Meadows on the south; the Park boundary on the east to the east fork on the west. Approximately 400 trees were treated within this unit in 1957.

4. Badger - Robinson--32,282 acres; 420±99 infested trees.

All the timbered area west of the east fork of the Sevier River south to and including Robinson Creek constitutes this unit. The number of infested trees remains static as compared to the 1956 reconnaissance survey. This area received no control in 1957.

5. Proctor Canyon--500 acres.

All infested trees within the Proctor Canyon unit were logged in 1956.

6. Red Canyon - Wilson Peak--3,824 acres; 100±66 infested trees.

This unit lies between the Red Canyon Highway on the north and Wilson Peak on the south. The main body of timber lies along the ridges. Trees were treated within this area but are included within the Badger-Ahlstrom unit figure.

7. Below Bryce Rim--700 acres; 50 infested trees (scouted).

The ponderosa pine lies in stringers within this unit. The Park-Forest boundary bisects most of the canyon and it is rather difficult to assign attacked trees with accuracy. The estimate of 50 infested trees on the forest is based on a reconnaissance survey. Approximately 90 trees were treated within this unit in 1957.

8. Seeds Lake--800 acres; 100 infested trees (scouted).

This unit--an island of mature pine--was first reported in 1955. Salvage logging was done in 1956 and 1957. An unusually wet season prevented a ground survey of this unit and an aerial reconnaissance was substituted. Consequently the extent and result of the salvage logging control is not known at this time.

Johns Valley Division

The Johns Valley Division encompasses that area surrounding Pine Lake on the south to and including the area around Mud Lake and lying west of the bluffs and east of Johns Valley.

Approximately 650 trees were treated within this division in 1957. The insect survey revealed approximately 440±148 newly infested trees within this division, all of which are within the 1957 control area.

9. Pine Lake--23,844 acres; 360±127 infested trees.

This unit includes all pine timber east of Highway 22 and north of the Tropic road and extending to Sweetwater Creek.

In 1957 approximately 395 trees were treated. In comparison with the fall survey estimate (360±127 infested trees), this infestation appears to be continuing at the same level of intensity.

10, Mud Lake - Birch Creek--9,268 acres; 80±29 infested trees.

The majority of the area surveyed lies west of Mud Lake and extends south to Sweetwater Creek. This unit is composed of patches of commercial ponderosa pine.

Approximately 253 infested trees were treated during the 1957 Control Project. The 1957 survey estimate shows an apparent decrease in intensity.

Upper Valley Division

The Upper Valley Division encompasses Upper Valley and south to Canaan Mountain.

The 1957 surveys constituted the first formal cruise of this division in 10-15 years. Previously, aerial surveys have sufficed. The 5 percent survey revealed approximately 1,120±140 infested trees.

11. Upper Valley--14,344 acres; 880±133 infested trees.

The infestation within Upper Valley has been smouldering at a low endemic level for the past few years. The timber lies in rather large bodies and Dendroctonus barberi and D. convexifrons have been relatively active within these stands for some years. The present epidemic of D. ponderosae ranks higher in intensity than any of the older going infestations. (Table 1).

12. Canaan Mountain--8,360 acres; 240±63 infested trees.

The history of this infestation is similar to that of the Upper Valley unit. The timber stands are patchy and smaller in size. The intensity of the infestation is average as compared to the units of the east fork division (Table 1).

Bryce Canyon National Park

10,268 acres; 180 infested trees.

All of the timbered area south of the Tropic road within Bryce Canyon National Park has undergone repeated control projects. For purposes of this survey the park has been divided into two units; above and below the rim.

Approximately 800 trees were treated in 1957. There are approximately 180±19 currently infested trees, all of which are within the 1957 control area.

The survey revealed that the area above the rim, 9,568 acres, contained 80±44 infested trees below the rim; 700 acres contained 100 infested trees. The first unit was surveyed by a 5 percent cruise; the latter by scouting.

SURVEY SUMMARY AND RECOMMENDATIONS

A systematic survey was conducted on the Dixie National Forest and the Bryce Canyon National Park to detect, locate and describe infestations of the Black Hills beetle. This survey, using both a 5 percent cruise and scouting techniques, covered 131,360 acres on the forest and 10,268 acres on the park. Approximately 2,620±286 infested trees are on the forest and 180±19 trees on the park.

All the units that received control treatment on the east fork division showed a reduction in the number of infested trees. The Badger-Robinson unit remained static; however no treatment was carried out in this unit in 1957. All infested trees were logged in the Proctor Canyon unit and control for 1958 is not recommended. Within the remaining units the number of 1957 infested trees is less than in 1956, but the number of beetle galleries per square foot has increased. It appears as a case where the population has remained relatively static, but concentrated attacks on fewer trees. Control is recommended for these units.

Within the Johns Valley division the Pine Lake infestation remains static and a reduction occurred in the Mud Lake unit. As in the case on the east fork division control measures should be taken in 1958 to prevent intensification of infestations.

The infestation on the upper valley division is relatively new and quite aggressive. Consequently a control program is recommended for this division.

The infestation on the Bryce Canyon National Park shows a marked reduction in 1957. However in order to provide maximum protection to the park and in keeping with the surrounding control programs, treatment of this infestation is recommended.

The justification for treatment of these divisions lies within more or less hidden factors not evident if only new attacks per acre are considered. The timber stands are broken by small openings which make it impossible for the attack per acre figure to be fully representative of the stand. Even within the commercial stands the number of ponderosa pine stems per acre is very light. Consequently a small new attack per acre figure can and does represent a relatively high percentage of available pine in infestation centers.

On most of the Dixie National Forest and Bryce Canyon National Park a high population does exist. This, coupled with seven years of drought, presents an entomological "powder-keg" requiring continued vigilance and prompt detection of any developing flareups. It is hoped that the increased moisture in 1957 might alleviate this situation.

Table 1. Summary of the Black Hills beetle infestation on the Dixie National Forest and Bryce Canyon National Park, 1957

		Area in acres	Est. N. A.	N. A./A	S. M. E.
1.	Badger - Ahlstrom	16,152	220±70	0.014	32%
2.	Daves Hol. - East Cr.	8,466	40±26	0.005	65%
3.	East Cr. - Crawford	13,320	80±40	0.006	50%
4.	Badger - Robinson	32,282	420±99	0.013	24%
5.	Proctor Canyon	All infested trees logged			
6.	Red Canyon - Wilson Pk.	3,824	100±66	0.026	66%
7.	Below Bryce Rim	700	50	0.071	Scouted
8.	Seed Lakes	800	100	0.125	Scouted
	Totals East Fork Div.	75,544	1,060±147	0.013	17%
9.	Pine Lake	23,844	360±127	0.015	35%
10.	Mud Lake - Birch Cr.	9,268	80±29	0.008	36%
	Totals Johns Valley	33,112	440±148	0.013	34%
11.	Upper Valley	14,344	880±133	0.061	15%
12.	Canaan Peak	8,360	240±63	0.029	26%
	Totals Upper Valley	22,704	1,120±140	0.049	13%
	TOTALS DIXIE N. F.	131,360	2,620±286	0.020	12%
13.	Bryce - above Rim	9,568	80±44	0.008	55%
14.	Bryce - below Rim	700	100	0.143	Scouted
	TOTALS BRYCE CAN. N.P.	10,268	180±19	0.018	48%

Table 2.--Average DBH and average number galleries per square foot of Black Hills beetle infested trees on the Dixie National Forest and Bryce Canyon National Park

Unit	Average DBH						Average No. Galleries/Sq. Ft.					
	1952	1953	1954	1955	1956	1957	1952	1953	1954	1955	1956	1957
Badger-Ahlstrom	18.8	17.0	17.2	15.4		15.9	4.3	5.0	5.4	4.8		6.2
Daves Hol.-East Cr.	15.3	17.8	20.6	18.6	15.5	25.7	4.4	6.8	3.0	5.0	3.6	5.3
Ea. Cr.-Crawford	15.3	19.9	14.5	17.8	13.8	20.0	4.4	6.0	4.2	5.5	6.0	7.5
Badger-Robinson	20.0	19.0	19.4	16.0		16.1	4.4	5.0	6.4	4.6		6.4
Red Canyon	20.0	19.3	22.5	17.1		15.4	2.0	6.0	6.6	5.4		4.8
East Fork Averages	17.0	18.5	20.0	16.8	14.7	16.9	4.5	5.6	5.7	5.1	4.7	6.2
Pine Lake						17.8						7.4
Mud Lake-Birch Cr.				25.1		17.8				5.2		4.0
Johns Valley Ave.				25.1		17.8				5.2		6.8
Upper Valley						22.5						6.2
Canaan Peak						18.5						6.2
Upper Valley Averages						21.6						6.2
Dixie N.F. Ave[1]	19.1	19.9	19.5	19.7	14.7	19.3	4.0	5.4	5.4	4.7	4.7	6.3
Bryce Canyon N.P.	22.0	19.9	18.3	20.8		20.0	3.5	4.8	6.2	5.3	4.0	0[2]

1/ Includes Mammoth Division data from 1952 through 1955.

2/ Negative report due to faulty sampling technique--only one tree sampled per plot from side of tree facing plot center.